

Notice of Allowability

Application No.

09/778,144

Examiner

Henry S. Hu

Applicant(s)

HODGE, THOMAS

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE of August 3, 2004.
2. ☒ The allowed claim(s) is/are 1,8,9 and 25.
3. ☒ The drawings filed on 07 February 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

1. Applicants' RCE and its amendment after final filed on August 3, 2004 and June 29, 2004 respectively were both received.

Parent Claim 1 was amended, Claims 2-7 and 10-12 were cancelled and new Claim 25 was added. To be more specific, **Claim 1** was amended to incorporate all the limitations from **Claims 2-7 and 10-12** so as to narrow down the diene elastomeric matrix, the functional groups and using silica as white filler. New dependent **Claim 25** relates to the amount of silica and has support from original Claim 11. **Claims 1, 8-9 and 25 are pending now.** An action follows.

2. Claim rejections under Final Office Action filed on December 30, 2003 and Advisory Office Action filed July 15, 2004 are now removed for the reasons given in paragraphs 3-9 thereafter.

Allowable Subject Matter

3. Claims 1, 8-9 and 25 are allowed.

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4. The following is an examiner's statement of reasons for allowance: The above claims 1, 8-9 and 25 are allowed over the closest references:

5. *The limitation of amended parent Claim 1 of present invention relates to a heavy-vehicle tire comprising a tread which is formed from a cross-linked rubber composition, the composition comprising:*

(a) an elastomeric matrix comprising a functionalized diene elastomer co-polymer formed from a conjugated diene monomer and a vinyl-aromatic compound, the co-polymer having a glass transition temperature between -70°C and -20°C and a mass content of vinyl-aromatic units of 10-50 %, the elastomer having one or more of its chain ends a function group which is active for coupling to a reinforcing white filler, the functional group being selected from the group consisting of a silanol group and a polysiloxane block having a silanol end;

(b) a reinforced filler comprising at least 50% by weight of silica, the silica having a CTAB specific area of 80-260 m^2/g , and

(c) a reinforcing white filler/functionalized diene elastomer bonding agent.

See other limitations of Claims 8-9 and 25.

6. In view of the Applicants' RCE amendment, new parent Claim 1 of present invention specifically relates to "a heavy-vehicle tire" comprising a tread, wherein the tread is formed from a cross-linked rubber composition. This parent claim has been amended to carry all the limitations from Claims 2-7 and 10-12 so as to narrow down the

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issues of diene elastomer, functional groups and white filler as following “a functionalized diene elastomer co-polymer formed from a conjugated diene monomer and a vinyl-aromatic compound, the co-polymer having a glass transition temperature between -70°C and -20°C and a mass content of vinyl-aromatic units of 10-50 %” for **diene elastomer**, “the functional group being selected from the group consisting of a silanol group and a polysiloxane block having a silanol end” for **functional group** and ; “silica having a CTAB specific area of $80\text{-}260\text{ m}^2/\text{g}$ ” for **white filler**.

7. With respect to **two 102 rejections** for the original two set of Claims 1-6, 8 and 11 as well as Claims 1-3 and 6-9, none of the two references has taught or fairly suggested such a cross-linked rubber composition for using in heavy-vehicle tire. In a close examination, both the prior art of Araki and Micouin do not disclose the claimed elastomeric matrix. As pointed out by the Applicants on page 6 of Remarks, **Araki's coupled** copolymer is only obtained by first treating with lithium to activate the end of chain and then coupling the chainends of the functionalized polymer, **it is therefore no more an endgroup-functionalized polymer**.

As pointed out by the Applicants on page 6 of Remarks, **Micouin's** modified copolymer is only obtained from being **coupled and/or starred or else functionalized with a coupling agent and/or starring or functionalizing agent** (column 8, line 48-50). It is only a general statement since there is no disclosure about what is the modification on endgroups of polymers. It is noted that **silica coupling agent and/or silica covering**

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agent such as alkoxysilanes may be added in the polymer's composition but not in the end of polymerization.

8. With respect to the **103 rejection for Claims 1-12**, Vasseur's rubber composition is only useful for the **crown reinforcement, which is located between the carcass and the tread of tire** (title; abstract, line 1-4). Additionally, Vasseur is silent of the claimed silanol function on the end groups of polymers. Therefore, a motivation to connect between Vasseur and Araki is lacking to apply the cross-linked diene rubber composition for making **tread of tire**.

With respect to **other three 103 rejections for set of Claims 7 and 10, set of Claims 9 and 12 as well as set of Claims 4-5 and 10-12**, the secondary Agostini reference only teaches that silica with the claimed CTAB can be used in the tire manufacture to function properly as a filler; while the other secondary **Loiselle** reference only teaches that a heat curable liquid silicone rubber composition comprising vinyl-containing polydiorganosiloxane and organohydrogensiloxane will improve hydrocarbon oil resistance. Therefore, either Agostini or Loiselle cannot fix the deficiency on Claim 1 over Araki or Micouin.

It is noted that **new Claim 25** relates to the amount of **silica** and is dependent from parent Claim 1. In summary, the above-mentioned **five** references, in combination or alone, fail to teach or fairly suggest using the claimed process.

Additionally, the present invention has shown in examples along with some comparative examples for making **a tread** specifically for **a heavy-vehicle tire** (see pages 18-27 for **examples 1-2** along with its **Tables 1-5**). Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

9. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US Patent No. 5,227,425 to Rauline discloses a copolymer rubber composition comprising (A) an **amino**-modified diene polymer, (B) silica, and (C) a coupling agent (column 7, line 22-23; abstract, line 1-20). Although copolymer of conjugated diene and vinyl-aromatic is used (column 3, line 43-54), no claimed elastomeric matrix with **silanol endgroup** is disclosed. Additionally, no claimed silica with specific CTAB is used. Therefore, Rauline fails to teach or fairly suggest the limitation of present invention.

US Patent No. 6,765,045 B1 to Daniel et al. discloses a vulcanizable rubber composition comprising (A) an **amino**-modified diene copolymer, (B) silica, and (C) a silane-typed coupling agent (column 2, line 41 – column 3, line 14; abstract, line 1-15). Although copolymer of conjugated diene and vinyl-aromatic is used (column 3, line 25 – column 4, line 22), no claimed elastomeric matrix with **silanol endgroup** is disclosed.

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Additionally, no claimed silica with specific CTAB is used. Therefore, Daniel fails to teach or fairly suggest the limitation of present invention.

10. The three key issues, regarding the issues of diene elastomer, functional groups and white filler as following “a functionalized diene elastomer co-polymer formed from a conjugated diene monomer and a vinyl-aromatic compound, the co-polymer having a glass transition temperature between -70°C and -20°C and a mass content of vinyl-aromatic units of 10-50 %” for **diene elastomer**, “the functional group being selected from the group consisting of a silanol group and a polysiloxane block having a silanol end” for **functional group** and ; “silica having a CTAB specific area of $80\text{-}260\text{ m}^2/\text{g}$ ” for **white filler**., cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

11. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the independent and parent **Claim 1** is allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending **Claims 8-9 and 25** are passed to issue.

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12. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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January 4, 2005



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